The Admission Decision Support System for Muhammadiyah Student Association Cadres Using the Profile Matching Method

Rusydi Umar[1], Anton Yudhana[2], Jaka Dernata[3*]

[1,3]Department of Informatics, Universitas Ahmad Dahlan, Indonesia
[2]Department of Electrical Engineering, Universitas Ahmad Dahlan, Indonesia

`[1]rusydi@mti.uad.ac.id`, `[2]eyudhana@ee.uad.ac.id`, `[3]jaka2007048018@webmail.uad.ac.id`

Abstract - Technological advances are beneficial for humans in doing work, one of which is that technology can help humans make decisions. Muhammadiyah Student Association is a large organization. The establishment of this organization continues to have progress to make many students join the organization. With many students who want to join, the organization has difficulty determining the eligibility of each prospective member who wants to join because the organization must pay attention to factors that can support the assessment in the acceptance of its members. This research aims to conduct the selection process of organizational members using profile matching methods to help the organization solve the problems faced by making the right decision. Then the result obtained is a decision that follows the organization's expectations in the selection of new prospective members. The assessment used in this method consists of four aspects, two of which are core factors and two other aspects are secondary factors. The data processing results will become a ranking format so that this method can also determine the best candidate members based on ranking.

Keywords: Decision Support System, Profile Matching, IMM

I. INTRODUCTION

Every organization will recruit new members to create the next generation that will bring the organization to be better and better known to many people. The Muhammadiyah Student Association (Ikatan Mahasiswa Muhammadiyah), abbreviated as IMM, is an Islamic student movement organization based on Islamic creed, sourced from the Al-Quran and As-Sunnah [1]. IMM annually recruits its members from various study programs chosen by students. The problem that occurs during organizational recruitment is when the organization selects prospective new members. The selection, of course, should not be subjective because it will reduce ethics in the organization. Therefore, a method is needed to carry out data processing for the selection fairly and efficiently [2-4].

A Decision Support System is a system that solves problems, solves specific problems, and can be done in a structured and unstructured way. Decision support systems are designed to be used easily by people with basic computer operating skills. The decision support system is used as an alternative in making a decision [5-7]

The Profile Matching method is one of the methods that can be used as an option for the selection of prospective IMM members. Because this method assumes that there is an ideal value that must be owned by the selection participant, not the minimum level that must be met or skipped, this method compares the competency of each participant with the standard competency criteria that have been determined by the selection committee, so that the gap or the difference in the assessment of each competency and criteria is obtained. The smaller the gap or the resulting difference, the greater the weight value. Conversely, the weight value gets smaller when the resulting GAP is getting bigger. So, prospective members with a significant weight value will have a great chance of graduating in this selection [8-9].

The reference for previous research studies is the research conducted by [10] through the Application of the Profile Matching Method in the Decision Support System for the Selection of Study Program Chairs. Research conducted by [11] researched the Decision Support System Using the Profile Matching Method in selecting the Best Salesman. Research conducted by [12] researched decision support systems to level up position using profile matching methods. Research conducted by [13] researched the Application of Profile Matching Methods in the Support System of The Best Lecturer Selection Decision (Case Study: South Tapanuli Institute

of Education. Research conducted by [14] Researching the Selection of the Best Employees Using the Profile Matching Method at PT. Surinder Pure Agung.

The Profile Matching method will result in two conditions of prospective IMM members, namely the condition of graduating and not graduating. Then the final result of this method can be compiled so that it has a ranking whose result is the ranking of the best prospective IMM members. From these rankings, the selection committee can ascertain which participants can be recruited to join the IMM. Therefore, this study aims to analyze the support system for admission decisions of prospective IMM cadres using the Profile Matching method. In comparison, the benefit of this research for the IMM is that it can be one of the options in selecting new prospective members [15-16].

II. METHOD

A. Data Collection

Data was collected using a written test and a practical test. At this stage, participants will take a written test to determine the participants' knowledge of Muhammadiyah, abbreviated as MUH and IMM. Then practice tests to determine the ability of participants to read the Qur'an (Baca Write Al-Quran), abbreviated BTA, and worship.

B. Flowchart Profile Matching Method

The Profile Matching method has several stages in the process and can be seen in the flowchart presented in Fig. 1.

From the flowchart in Fig. 1, it can be concluded that there are six stages in the Profile Matching method process, namely:

1) Input participant criteria value: At this stage, the selection committee will input criteria data for each participant following the criteria value.

2) Gap mapping: To map the value of the gap, it takes the ideal value of each criterion. The ideal value is the maximum value of each criterion specified in Tables I to IV. Then the value of the criteria is reduced by the ideal value to produce the value of the gap/difference[17].

3) Weighting: Each gap that has been generated will be converted into weights [18].

4) Calculation and grouping of Core Factor and Secondary Factor: All criteria aspects are divided into two parts. In the Core Factor section, there is the Qur'an and Worship. While the Secondary Factor section, there are Muhammadiyah and IMM. The ratio used by Core Factor and Secondary Factor is 60: 40. The formula used is contained in the formula (1-2) as follows [19-20]:
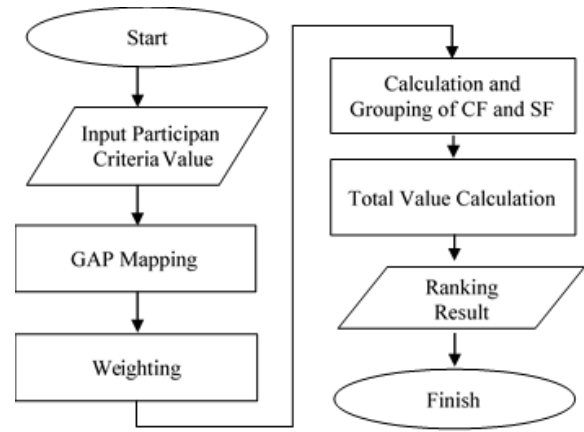

Fig. 1 Flowchart stages of profile matching method

- The Formula for Calculating Core Factor

$$NCF = \frac{\sum NC(Criteria)}{\sum IC} \quad (1)$$

Description:
NCF : Value Core Factor
NC(Criteria) : Number of values Core Factor
IC : Number of items Core Factor

- Calculating Formula Secondary Factor

$$NSF = \frac{\sum NS(Criteria)}{\sum IS} \quad (2)$$

Description:
NSF : Value Secondary Factor
NS(Criteria) : Number of values Secondary Factor
IS : Number of items Secondary Factor

5) Total Value Calculation: After getting the value of the Core Factor and Secondary Factor, the next step is to get the total value by using the formula in (3) [21]:

$$Ntotal(Criteria) = (x)\%.NCF(Criteria) + (x)\%.NSF(Criteria) \quad (3)$$

Description:
NCF(Criteria) : Core factor average value
NSF(Criteria) : The average value of the secondary factor.
Ntotal(Criteria) : Total value of criteria
(x)% : The x percent value

6) Ranking: The ranking is based on the total score with the highest to the lowest (descending) score.

III. RESULTS AND DISCUSSION

In the process Profile Matching, in general, is the process of comparing between competencies each participant with standard competency criteria that have been determined by the organization, so that can know the difference in incompetence (also called the GAP), the smaller the gap is generated, the greater the weight value which means it has a greater chance of to graduate as a new member of IMM. In this discussion, the implementation of the Profile Matching method requires six stages.

1) Input participant criteria value: At the initial stage in using this method is to set a value for each required criterion, it can be seen in Table 1 – IV the following.

Tables I to IV are the weight values of the competency standards for each aspect of the criteria or the value of the provisions of each variable used. The competency standard weight data on each criterion used in this study has a target or standard that the selection committee has determined for new prospective members. The criteria values in Table II are different from other criteria values because the reading and writing value of the Koran is essential for the graduation of prospective participants who will take part in IMM. After all, the committee hopes that everyone in IMM must read the Koran. Table V is the result of acquiring the value of prospective new members on each criterion.

TABLE I
CRITERIA FOR READING AND WRITING
AL-QURAN VALUE

Category	Value
Can't read Al-Quran	0
Can't not read well	1
Can read less well	2
Can read well	3
Can read very well	4

TABLE II
WORSHIP CRITERIA VALUE

Category	Value
Unable to worship	0
Can worship less well	1
Can worship well	2

TABLE III
MUHAMMADIYAH KNOWLEDGE CRITERIA VALUE

Category	Value
Do not know	0
know a little	1
Knowing	2

TABLE IV
IMM KNOWLEDGE CRITERIA VALUE

Category	Value
Do not know	0
know a little	1
Knowing	2

TABLE V
PARTICIPANT DATA VALUE

No.	Initial Name	BTA	WORSHIP	MUH	IMM
1	NA	3	2	2	2
2	RCA	1	1	2	2
3	RS	2	1	1	1
4	TG	3	1	2	1
5	PMS	1	1	1	1
6	AAP	3	1	3	2
7	RKL	2	1	2	2
8	JJY	1.5	1	0	1
9	RSp	1	2	0	1
10	FPE	2	1	2	0

In Table V the data on the value of the participants in this study were obtained from the Screening Test results for the basic regeneration activities of the IMM. In this study, the data for the calculation process was only taken from 10 participants out of a total of 21 participants.

2) Gap Mapping: The required gap results from subtracting the criteria value from the ideal value. The ideal value is determined from the maximum value based on Tables I to IV. Then the ideal value obtained can be seen in Table VI as follows.

In Table VI Gap/difference mapping is the GAP mapping process. the committee for the acceptance of new prospective members conducts a direct assessment of each prospective participant on several predetermined criteria, and after the assessment, the next step will be matching with the ideal value desired by organization. This matching helps get the value of the difference between the criteria value and the ideal value. The GAP results are calculated by reducing the criteria value with the ideal value. the results from the GAP mapping can be seen in Table VII.

In Table VII, the results of the criteria values become the gap values / differences between the criteria values and the ideal values, to get the GAP value, for example, the participants on behalf of NA on the BTA criteria, reducing the criteria value with the ideal value in Table VI, namely 3 - 4 = -1 then the value of NA's GAP BTA criteria in Table VII is -1 after the difference value is

obtained, the next step is to find the weight value for each criterion.

3) Weighting: After the GAP value for each criterion is obtained, each criterion value is converted into a weight value, to convert this value that is follows the provisions of the value in the value weight table which, can be seen in Table VIII [22].

TABLE VI
GAP MAPPING

No.	Initial Name	Criteria Value			
		BTA	WORSHIP	MUH	IMM
1	NA	3	2	2	2
2	RCA	1	1	2	2
3	RS	2	1	1	1
4	TG	3	1	2	1
5	PMS	1	1	1	1
6	AAP	3	1	3	2
7	RKL	2	1	2	2
8	JJY	1.5	1	0	1
9	RSp	1	2	0	1
10	FPE	2	1	2	0
	Ideal Value	**4**	**2**	**2**	**2**

TABLE VII
GAP RESULTS

No.	Initial Name	GAP BTA	GAP WORSHIP	GAP MUH	GAP IMM
1	NA	-1	0	0	0
2	RCA	-3	-1	0	0
3	RS	-2	-1	-1	-1
4	TG	-1	-1	0	-1
5	PMS	-3	-1	-1	-1
6	AAP	-1	-1	1	0
7	RKL	-2	-1	0	0
8	JJY	-2.5	-1	-2	-1
9	RSp	-3	0	-2	-1
10	FPE	-2	-1	0	-2

In Table VIII, if the result of the GAP reduction is "0", it will get a weighted value of "5" which means that there is no difference or value for prospective participants according to the standard value of the organization, or if the result of GAP reduction is "1" then it will get a weighted value of "4.5" which means the value of the prospective participant is one level 1 level higher than the organizational standard. The results of the conversion into the weight values of IMM cadres candidates can be seen in Table IX.

Table IX is the result of converting the gap/difference value into a weighted value. After all the weight values are obtained, in that table (WGAP) is the GAP Weight. The following process groups the assessment variables into Core Factor (CF) and Secondary Factor (SF).

4) Calculation and grouping of Core Factor and Secondary Factor: In calculating the Core Factor in this study using the formula (1) where NC works to find the weight value, including BTA and WORSHIP Criteria. At the same time, IC is the number of criteria items selected as the Core Factor. The following is the calculation based on (1).

$$NCF(NA) = \frac{4+5}{2} = 4.5$$

Based on the formula (1) calculation on behalf of the participant NA by calculating the value of WGAP BTA and WGAP WORSHIP, then dividing by two criteria produces a value of 4.5. This value indicates the value of the first Core Factor. While the Secondary Factor Value can be determined by (2).

NS is the sum of the weight values on the MUH and IMM criteria. While IS is the number of selected criteria items grouped into Secondary Factors. The following is the application of the calculation based on (2).

$$NSF(NS) = \frac{5+5}{2} = 5$$

TABLE VIII
WEIGHT VALUE

No.	difference	Weight Value	Description
1	0	5	No difference (competence as required)
2	1	4.5	Individual competence excess 1 levels/level
3	-1	4	Individual competence is less than 1 level/level
4	2	3.5	Individual competence excess 2 levels / level
5	-2	3	Individual competence less than 2 levels/level
6	3	2.5	Individual competence excess 3 levels / level
7	-3	2	Individual competence lacks 3 levels/level
8	4	1.5	Individual competence lacks 4 levels/level
9	-4	1	Individual competence lacks 4 levels/level

TABLE IX
CONVERSION RESULTS INTO WEIGHT VALUE

No.	Initial Name	WGAP BTA	WGAP WORSHIP	WGAP MUH	WGAP IMM
1	NA	4	5	5	5
2	RCA	2	4	5	5
3	RS	3	4	4	4
4	TG	4	4	5	4
5	PMS	2	4	4	4
6	AAP	4	4	4.5	5
7	RKL	3	4	5	5
8	JJY	3	4	3	4
9	RSp	2	5	3	4
10	FPE	3	4	5	3

TABLE X
RANKING

Initial Name	Total Value	Ranking
NA	4.7	2
RCA	3.8	10
RS	3.7	11
TG	4.2	6
PMS	3.4	19
AAP	4.3	5
RKL	4.1	8
JJY	3.5	16
RSp	3.5	17
FPE	3.7	12

Based on the formula (2) calculation on behalf of the participant NA by calculating the value of WGAP MUH and WGAP IMM, it is then divided by two criteria to produce a score of five. This value indicates the value of the second Core Factor.

5) Total Value Calculation: The ratio of *Core Factor* and *Secondary Factor* is 60: 40. Then the Core Factor and Secondary Factor values need to be converted according to a predetermined ratio. To get the total value, the calculation using formula (3) is as follows:

$$Ntotal = (60)\%.NCF(criteria) + (40)\%.NSF(criteria)$$
$$Ntotal\ (NA) = (60\% \times 4.5) + (40\% \times 5)$$
$$= 4.7$$

Thus, NA got a total value of 4.7.

6) Ranking Result Output: The last step is after the total value is obtained, then the ranking process is carried out by sorting most significant value to the smallest. Where the ranking results can be seen in Table X.

In Table X are the final results in this study based on testing and discussion of the use of the profile matching method, this method can assist in determining a decision, and by doing this research, it can be understood how the procedures carried out to meet the requirements in research using the profile method matching. Based on the process of the Profile Matching method in this study, the one with the highest score out of 10 potential participants was the participant on behalf of NA with a score of 4.7 and got a position in rank 2 of the total number of participants as many as 21 prospective IMM member candidates based on the calculation of the Profile Matching algorithm.

IV. CONCLUSION

This study combines a decision support system with the Profile Matching method. As a result, this method can provide objective recommendations if you follow the steps of this method correctly so that it can be used to determine prospective IMM members to be recruited and find the best participants. However, the Profile Matching method will be more effective if the item criteria are more varied and optimal. From the final results or rankings, NA got a score of 4.7 in 2nd place, RCA got a score of 3.8 in 10th place, and RS got a score of 3.7 in 11th place. And from the total count results, three participants did not qualify. with values below 3.4. This study proves that the profile matching method can be used in determining decisions by using criteria in the form of values from test results obtained from organizations or institutions.

REFERENCES

[1] A. Nugroho, F. Agama, I. Universitas, M. Purwokerto, and K. Islami, "Peranan ikatan mahasiswa muhammadiyah dalam membentuk karakter islami mahasiswa di universitas muhammadiyah purwokerto 1,2)," pp. 203–216, 2019.

[2] M. Jundullah, R. Umar, and A. Yudhana, "Pengaruh Persepsi Kemanfaatan dan Kemudahan Penggunaan Terhadap Penerimaan Sistem E-Learning Di SMK Negeri 4 Kota Sorong," *Bina Insa. Ict J.*, vol. 8, no. 1, p. 11, 2021.

[3] V. Apriana, "Penerapan Profile Matching Untuk Menentukan," *J. Mantik Penusa*, vol. 3, no. 1, pp. 15–21, 2019.

[4] A. Yudhana, J. Rahmayanti, S. A. Akbar, S. Mukhopadhyay, and I. R. Karas, "Modification of

manual raindrops type observatory ombrometer with ultrasonic sensor HC-SR04," *Int. J. Adv. Comput. Sci. Appl.*, vol. 10, no. 12, pp. 277–281, 2019.

[5] R. Umar, A. Fadlil, and Y. Yuminah, "Sistem Pendukung Keputusan dengan Metode AHP untuk Penilaian Kompetensi Soft Skill Karyawan," *Khazanah Inform. J. Ilmu Komput. dan Inform.*, vol. 4, no. 1, p. 27, 2018.

[6] A. F. Kharis Hudaiby Hanif, Anton Yudhana, "Analisis Penilaian Guru Memakai Metode Analityc Heararchy Process (AHP)," *Seri Pros. Semin. Nas. Din. Inform.*, vol. 4, no. 1, pp. 186–189, 2020.

[7] K. H. Hanif, A. Yudhana, and A. Fadlil, "Analisis Penilaian Guru Memakai Metode Visekriterijumsko Kompromisno Rangiranje (VIKOR)," *J. Ilm. Mandala Educ.*, vol. 6, no. 1, pp. 6–11, 2020.

[8] J. Sundari, M. Informatika, T. Informatika, and M. Jakarta, "Perbandingan Metode SAW dan Profile Matching Pada Pemilihan Rumah Tinggal Studi Kasus : Perumahan Depok," vol. 2, no. 2, pp. 115–126, 2018.

[9] S. R. Astari *et al.*, "PENERAPAN PROFILE MATCHING UNTUK SELEKSI ASISTEN," vol. 16, no. 1, pp. 1–10, 2019.

[10] A. A. Tri Susilo, "Penerapan Metode Profile Matching Pada Sistem Pendukung Keputusan Pemilihan Ketua Program Studi (STUDI Kasus : Program Studi Teknik Informatika STMIK Musi Rawas)," *JUITA J. Inform.*, vol. 5, no. 2, p. 87, 2018.

[11] E. Sutinah, "Sistem Pendukung Keputusan Menggunakan Metode Profile Matching dalam Pemilihan Salesman Terbaik," *Informatics Educ. Prof.*, vol. 2, no. 1, p. 234409, 2017.

[12] D. N. Sholihaningtias, "Sistem Pendukung Keputusan Kenaikan Jabatan," *Sist. Pendukung Keputusan*, vol. 2, no. 3, pp. 282–288, 2018.

[13] Ermawita and R. Fauzi, "Penerapan Metode Profile Matching Pada Sistem Pendukung Keputusan Pemilihan Dosen Terbaik (Studi Kasus : Institut Pendidikan Tapanuli Selatan)," *J. Educ. Dev.*, vol. 8, no. 4, pp. 17–20, 2020.

[14] P. Pt and S. Murni, "Pemilihan Karyawan Terbaik Menggunakan Metode Profile Matching," vol. 1, no. 1, 2019.

[15] A. Yudhana, A. Fadlil, and E. Prianto, "Performance analysis of hashing mathods on the employment of app," *Int. J. Electr. Comput. Eng.*, vol. 8, no. 5, pp. 3512–3522, 2018.

[16] A. Prasetyo *et al.*, "PENGGUNAAN METODE PROFILE MATCHING DALAM SISTEM PENDUKUNG KEPUTUSAN KENAIKAN JABATAN PADA INSTITUSI BANK (STUDI KASUS PT Bank Negara Indonesia , Persero Tbk - KC PECENONGAN)," vol. 5, no. 1, 2019.

[17] M. D. Akbar, "Seleksi Pemilihan Karyawan Terbaik Menggunakan Metode Profile Matching," vol. 5, no. 2, pp. 138–143, 2020.

[18] R. P. A. Nugroho and Purwanto, "Rancangan Sistem Pendukung Keputusan Penerimaan Pegawai Menggunakan Metode Profil Matching," *Eksplora Inform.*, vol. 5, no. 1, pp. 33–42, 2015.

[19] H. Juliansa, S. Defit, and S. Sumijan, "Identifikaasi Tingkat Kerusakan Peralatan Laboratorium Komputer Menggunakan Metode Rough Set," *J. RESTI (Rekayasa Sist. dan Teknol. Informasi)*, vol. 2, no. 1, pp. 410–415, 2018.

[20] A. Alwendi, "Sistem Pendukung Keputusan Kenaikan Jabatan menggunakan Metode Profile Matching (Studi Kasus PT. Beyf Bersaudara," *J. Inform. dan Rekayasa Perangkat Lunak*, vol. 2, no. 2, p. 69, 2020.

[21] R. D. Permatasari and S. Pauriah, "Sistem Pendukung Keputusan Pemberian Bantuan Siswa Miskin (Bsm) Menggunakan Metode Profile Matching Pada Smk Al-Azhar Batam," vol. 3, no. 2, pp. 58–79, 2019.

[22] K. Sussolaikah, N. Payapo, R. Ramlan, K. Islam, and K. Kusrini, "Analisis Perhitungan Dengan Metode Profile Matching Untuk Memilih Penerima Beasiswa Bidikmisi," *CAHAYAtech*, vol. 7, no. 2, p. 147, 2019.